

The Canadian Entomologist

VOL. LVII.

ORILLIA, MARCH, 1925.

No. 3

METHODS OF COLLECTING, MOUNTING AND PRESERVING HEMIPTERA.

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(Continued from p. 32)

PREPARATION AND CARE OF COLLECTIONS.

In the preceding pages the best practice and hints for collecting have been set forth in sufficient detail to be of real help to the collector. Next after securing the specimens comes their proper preservation.

PRESERVATION OF SPECIMENS. There is no better all-round preservative than alcohol for specimens to be transported or kept for later study or mounting. For histological and anatomical purposes, insects should be hardened in some approved manner, as set forth in the many treatises on this subject. We will not go into this. For study of internal or external anatomy, they are best put into 70 per cent. alcohol and then into 95 per cent. For immediate anatomical study, the fresh-killed insect is, of course, best. All these details will be found in the works on the subject.

For transportation and preservation for mounting, the bugs are put in ordinary 3 inch shell-vials with a small slip bearing the data *in pencil*. If more than one lot is put in the vial, each separate date or habitat may be divided from another by a little wad of soft tissue paper, not too hard. This has the great advantage that there are no fibers to catch and break off tarsi or antennae. Such delicate forms as the *Miridae*, however, are best kept dry between layers of cotton batting, on very soft, crinkled tissue paper in small cardboard boxes.

Bugs should be pinned promptly while soft, otherwise legs and antennae drop off. Those to be mounted on points may be allowed to set, as a careful preparator will not knock off any parts. Do not leave in the killing bottle over 24 hours, otherwise they may decay and the gases cause the extrusion of parts habitually concealed.

PINNING. For bugs the best size of pins for general use is No. 2, larger forms, such as Belostomatids, require larger pins, say No. 3 and occasionally No. 4. Bugs too small to pin on a No. 2 pin should be mounted on points; all Mirids and Lygaeids, except the larger *Lygaea* and *Oncopeltus* should be mounted on points.

Hemiptera, it is ordinarily said, should be pinned through the scutellum. It is well, however, to set the pin a little to the right of the center, so any central sculpture or other structure may be visible and unmarred. *Corixidae* large enough to be pinned (something not quite advisable, in my view) should be pinned through the right corium, care being taken not to get on the suture, otherwise the hemelytron will split.

The proper height at which the bug should stand on the pin is a moot question. My own view is that where high power magnifiers or the microscope

may have to be used, the head of the pin should not project above the insect more than 7 or 8 mm., otherwise the glass cannot be put in focus. The height is to be adjusted by means of a 3-step pinning block. The lowest step is for the distance of the head from the insect; the second for the label; and the highest for pushing the insect up on the pin. Dr. H. M. Parshley uses a solid copper block with three holes drilled into the proper depth.

MOUNTING ON POINTS. This is the proper procedure for insects too small to be pinned, which means bugs less than 6 mm. long or else very narrow forms, like *Neididae* or *Hydrometridae*, and the like.

Points are of many kinds, sizes, shapes and material. Some like them small—6 or 7 mm. long—and very fine pointed; others long—up to 10 mm. long—and fine or broad-pointed, according to purpose. Points may be cut with a pair of scissors from a strip as wide as the length of the point. A little practice will enable the preparator to cut them of fairly regular width. This avoids the ragged edge on points made with a punch.

In my own practice my points are 9 or 10 mm. long and of varying widths to suit the specimen. They are cut from heavy drawing paper, which is stiff, of adequate thickness, a fairly permanent white and fibrous enough to hold tight to the pin without shifting about it. There is great disadvantage in a thin paper, and not any great advantage in Bristol board or mica, celluloid or gelatine points. I will freely admit right here that a properly mounted collection on celluloid points is a very pretty thing, but we are considering not beauty but a practical working entomologist's material suitably prepared for study.

The bugs may be fastened to the points with ordinary liquid glue, with shellac, or with the usual recommended gum tragacanth properly prepared. For years past I have used only a glue to which the late L. H. Jontel introduced me. It is made of clear white cooking gelatine, granulated, dissolved in glacial acetic acid and fairly thick. This sets very quickly *without glazing over* while mounting is in progress, and grips even such slippery things as *Dytiscidae* among the water beetles. It is put on the points either with a thin glass rod drawn to a point, or with one of the ordinary glass pens to be bought at stationery shops. It may be kept in a small balsam bottle with a loose cap cover setting on a ground circle. To make it airtight and prevent evaporation of the glacial acid, the lower edge of the cap should be smeared with vaseline or petroleum jelly, which is unacted on by the acid and forms a perfect seal. The glass rod should be kept in the bottle.

In every case, except as pointed out later, the points should be bent down at the end about $\frac{1}{2}$ to 1 mm. at an angle to suit the bug to be mounted on them. The glue is put on like a little drop or blister with the rod, and the bug, picked upon a moistened sable pencil or by a leg with a forceps, is brought up against the glue about midway of the body, between the legs. By doing this one-half of the abdomen will be clearly exposed, which is very necessary since there are important distinctive characters on the underside of the body which must not be covered up. It is a great fault with most preparators of Hemiptera to overlook this very practical point. Such small things as the smaller *Microveliae*, *Hebridae*, the smaller Anthocorids and small Lygaeids like *Antilocoris*, are mounted differently. Fine points should be used for these, a tiny drop of glue put on the

point like a little knob and the side of the tiny insect set straight against the tip, *not* above it. The glue will hold it in position without difficulty. In the broader Tingidae, the point, not too fine, is kept straight, and the hemelytron is put right on the glue. *Aradidae* are similarly mounted because of their flat shapes and put about one third of the width of the body on the point.

It may happen that the specimen is not exactly balanced. In such a case, it may be straightened while the glue is setting and with a little skill and patience it will be quite level by the time the glue is hardened. In most cases, if the glue is of the right consistency, it will be quite set by the time the specimens are labelled and they may be safely put in a box for preservation.

SOFTENING. If it should be necessary to soften bugs received dry, they may be put in a relaxing box of the usual style. However, for rapid action, nearly all bugs that require softening may be put into hot water for a few minutes and then drained on blotting paper. They may be pinned as if fresh. Small specimens to be put on points should *not* be softened; and Mirids particularly should *never* be wet or moistened, even in alcohol.

MOUNTING FOR THE MICROSCOPE. To prepare small Hemiptera—Tingids, Veliids, etc., for mounting on slides entire, the quickest and best way is to throw the living insect into a mixture of turpentine 2 parts and carbolic acid 100% 1 part. The bug stretches right out and after 24 hours may be mounted in balsam on a slide. This brings out internal details as well as dehydrates the specimen. The method is given at length in Can. Ent. 1908 vol. XL. pp. 355-356.

BOXES. Any good box will do. For the ordinary run of specimens the usual 8 x 12 box is the right size. Bigger boxes are too cumbersome, except for such large forms as *Belostomatidae* and *Nepidae*.

ARRANGEMENT OF THE COLLECTION. It is best to set the bugs in boxes in rows of fours, in columns. The size of the insects will set the number of columns in a box, which generally runs to five or six for small ones on pins.

They should, of course, be arranged in their natural sequence within the genus, and the genera within the family. The boxes may be arranged according to the order of the families. It is well to make this arrangement in accordance with some standard catalogue adopted by the collector. Although it is done, it seems inadvisable to classify according to faunas, because by doing this we lose the biological idea of continuity. In any case, with rare exceptions, Hemiptera divide themselves into fairly homogeneous faunal groups, within genera, families and sub-families. It is, of course, possible in extensive groups to mark on boxes on the outside the contained faunal region in addition to the family and subfamily. To find genera or species in an extensive collection becomes difficult without some indication of its contents on the outside of the box. This is readily overcome by noting in pencil on the label the *pages of the catalogue* which contain the genera of the bugs in each box. Thus, the index of the catalogue becomes the index of the collection, and to find any given form, it is only necessary to consult the catalogue index and find the page number on the box. In fact, only *one* page number need appear on the box—that of the first genus in it.

CARE OF THE COLLECTION. The two chief foes of an insect collection are insect pests and mould.

The leading pest is the little *Dermestes* which has a special love for choice specimens and uniques. If the boxes are tight and strange insects are disinfected before being put in them, there is little danger of infestation. However, to guard against such a possibility, naphthalene or tar camphor, either in flakes or balls on a pin, is the most commonly used deterrent. Nowadays we have another excellent substance which not only keeps out the pests, but kills them if they are in, which is paradichlor-benzine, used in killing peach tree borers. (This, by-the-by, has been recommended also as a killing agent, but as it is slow and deliquescent it is not all that it might be). In my own practice, flake naphthalene is used with a little paradichlorbenzine. A little heap is made in one corner of the box and wet with tetrachloride of carbon. This causes it to stick together and also kills any pests that may be in the box unnoticed. If pests already have unfortunately got into the box, the usual method is to put in about a tablespoonful of bisulphide of carbon in the box. In private collections this is disagreeable because of its vile smell and dangerous because of the explosive and poisonous nature of the vapor of bisulphide of carbon. Carbon tetrachloride should therefore take the place of bisulphide, and when used in combination with paradichlorbenzine it gives positive and lasting results. The paradichlorbenzine may even be dissolved in the tetrachloride and poured in as a liquid to sink into the bottom of the box. This does not stain, except under little understood and exceptional conditions.

Mould is a deadly enemy to collections, especially in damp climates or in exceptional conditions of humidity lasting for long periods of time. In India, an extremely moist climate, it has been found that naphthalene prevents the development of mould, even though the spores be present. If, unfortunately, mould should get into a collection, small specimens will be ruined beyond help and should be thrown away. Larger ones, however, may be cleaned quite satisfactorily.

CLEANING BUGS. In addition to getting mouldy, bugs, especially the leaf-eating forms, are subject to greasiness. They sometimes get very dusty and dirty also, particularly those received mounted from the outside.

For degreasing ether, chloroform and gasoline or benzine are recommended and are good. However, carbontetrachloride here again is most useful to the collector. Mounted insects just received and any dusty ones out of one's own collection, may be put into a widemouthed bottle with tetrachloride and shaken—not too roughly—for a couple of minutes. They are now taken out and very promptly the liquid evaporates, leaving the insects clean and fine. Greasy bugs may be left for 24 hours or even longer in the tetrachloride and they will be found quite clean at the end of that time. This liquid is, however, slower than ether or benzine. In the case of verdigrised bugs there is nothing better. The tetrachloride dissolves the verdigris completely, and even eats out the verdigrised pin, leaving the bug in suitable condition for repinning.

To clean from mould is a more tedious operation. The bug is first wet thoroughly in tetrachloride and then brushed with a camel's hair brush which has been cut short until it is quite stiff and flat. Care should be taken, of course, not to brush off legs or antennae. This being done the bug is immersed in an-

other container of tetrachloride and left there while others are getting the preliminary brushing. This removes all loose material. The bug is now gone over with a fine brush wet in tetrachloride and little specks are removed under the magnifying glass. A third container of clean tetrachloride now receives it for a final purging; and except in obstinate cases, from this last bath the bug may be dried and put into the collection, or even put in wet if haste is necessary.

The exception to this way of cleaning is the *Belostomatids*, *Naucorids* and *Nepids*, which may be put right into hot (not boiling) water, and washed with a large camel's hair brush and naphtha soap. As they are waterbugs, they are absolutely undamaged.

TRANSPORTATION OF COLLECTIONS. The safest way to transport bugs is in small vials in alcohol. These vials are packed in absorbent cotton in ordinary bottle mailing tubes, a few at a time. They then go quite safely through the mails. Of course, larger packages may be made in the same way for express or freight transportation. Boxes of pinned insects are packed in larger containers in excelsior. For foreign mailing, such packages must not exceed 12 oz. in weight and the pins must be well stuck in the cork. They are mailed by sample post and declared—Samples Natural History Specimens—No Commercial Value.

For domestic mail, there is no limit of ounces, but it is better to make small packages of only a few pounds weight to avoid heavy bumps. Large bugs should be secured in the usual manner by putting two or four additional pins alongside the specimen.

CONCLUSION.

The preceding pages have been designed to give all the necessary directions to the collector of *Hemiptera*.

They contain the technique that I have found to give the most practical results in my experience. They are not, of course, either final or as inflexible as the laws of the Medes. Many of these things set forth are purely matters of opinion, as the length of points, for instance. But they will serve those whose experience is not yet lengthy and they may even have suggestive value to lifelong experts who may find in them additional reasons for their own preferences.

But such as these directions are, they are intended to be of real help to those who want to know how the other fellow does it in order to improve upon practice; and especially to those new in *Hemiptera*.

NOTES ON DIURNALS (LEPID., RHOPALOCERA)

BY WM. BARNES AND F. H. BENJAMIN,

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It appears advisable to call attention to a paper by Mr. H. G. T. Watkins which appeared in "The Entomologist", LVI, 1923, 204, entitled; "Notes on the Butterflies of the Banks Collection": the paper being mainly devoted to notes on Fabrician types.

Two names, *polixenes* and *melissa*, apparently heretofore omitted from lists of North American Lepidoptera, except in the case of a single reference in Morris' Catalogue, are added.

Oeneis polixenes Fabr.

1775, Fabr., Syst. Ent., p. 484, *Papilio*; *P. D. F.*
 1781, Fabr., Spec. Ins., II, 59, *Papilio*; *P.D.F.*
 1787, Fabr., Mant. Ins., II, 28, *Papilio*; *P.D.F.*
 1793, Fabr., Ent. Syst., III, (1), 152, *Papilio*; *P. N.*
 1860, Morris, Smiths. Miscel., Cat. Lep., p. 10, *Neonympha*.
 1868, Butler, Cat. Diur. Lep. Fam. Satyr., p. 164, *bore*, *Oeneis*.
 1869, Butler, Cat. Diur. Lep. Descr. Fabr., p. 37, *bore*, *Oeneis*.
 1923, Watkins, The Entomologist, LVI, 208, *Oeneis*.

Type locality: "America boreali".

Types: ♂, British Museum (Banks Collection).

Notes: according to Mr. Watkins the type is a male, and; "....agrees with specimens from Newfoundland, and belongs to the species, a form of which was subsequently described....as *subhyalina* Curtis."

Oeneis melissa Fabr.

1775, Fabr., Syst. Ent., p. 513, *Papilio*; *P. N. P.*
 1781, Fabr., Spec. Ins., II, 104, *Papilio*; *P. N. P.*
 1787, Fabr., Mant. Ins., II, 57, *Papilio*; *P. N. P.*
 1793, Fabr., Ent. Syst., III, (1), 141, *Papilio*; *P. N.*
 1869, Butler, Cat. Diur. Lepid. Descr. Fabr., p. 37, (*polixenes?*), *Oeneis*.
 1923, Watkins, The Entomologist, LVI, 206 & 208, (=? *oeno* Bdv.), *Oeneis*.

Type locality: Newfoundland ("Insula Terre nueve Americae").

Types: presumably lost.

Notes: described from the Banks Collection, but that collection is now in the British Museum without this type. Mr. Watkins states that the description points to the north-eastern race (? *oeno* Bdv.) of *semidea* Say, not agreeing well with *taygete* Hbn.

Barnes and McDunnough, 1918, Contr. N. H. Lep. N. A., IV, (2), 69 and McDunnough, 1921, Can. Ent., LIII, 82-83 list *semidea* distinct from *oeno* Bdv., but the latter author tells us (in litt.) that in view of recently examined Labrador material (see foot note) he is inclined to revise this opinion. It appears best to tentatively arrange the names:

Oeneis polixenes Fabr.

syn. crambis Frey

syn. also Moesch. (nec Bdv., nec. Bdv. & Lec.)

a. subhyalina Curtis

b. assimilis Butler

c. katahdin Newcomb

Oeneis melissa Fabr.

a. ? oeno Bdv.

b. semidea Say

syn. eriotosa Bdv.

Notes: "Satyrus eritiosa Harris", usually omitted from lists and probably a manuscript name, placed in the synonymy of *also* by Boisduval and Boisduval and Leconte, followed by a description of *semidea* from New Hamp-

Dr. McDunnough has kindly furnished the authors with a pair of *Oeneis* species from Labrador which are apparently conspecific with *semidea* although probably a valid subspecies. These appear to fit Boisduval's description and figures of *oeno* more closely than any other form known to us, and, as Dr. McDunnough points out to us, are certainly the *oeno* of Moeschler. This form can temporarily stand as *oeno* although there is a decided possibility of Lapland and Labrador specimens being distinct. Boisduval in reality described the Lapland form, merely including in his description the Siberia and Labrador forms. In all probability the so-called Labrador *oeno* will be a straight synonym of *melissa*, but topotypical material should be awaited before the Lapland, Labrador and Newfoundland names are combined.

shire, which facts presumably publish the name *eritiosa*. (See Opinions 1, 4, 53, and 78, of the Int. Com. Zool. Nomencl.).

Opinion 78 apparently would credit the name *eritiosa* Harris in Boisduval. Article 21 seems to definitely state that the responsibility of authorship rests with the first to publish a name "in connection with" at least an indication of what the name represents; in this case Boisduval. The matter involves more than mere authorship; becoming a question of what specimens should be considered types. If the name is credited to Harris, then the Harris specimens must be the types; if credited to Boisduval, then those specimens from which he described are the only published specimens and would appear to be the types. Pending settlement of this question the authors prefer to follow Article 21 and credit authorship "Bdy."

The mention of *Oeneis polixenes* by Mr. Watson, brought to the attention of the authors the case of *Papilio polyxenes* Fabr. (1775, Syst. Ent. p. 444, *Papilio*).

Papilio ajax Linn. (partim.)

1758, Linn., Syst. Nat., Ed. X, 462, (partim.), *Papilio*; *P. E.*
 1764, Clerck, Icones, II, pl. XXXIII, f. 3, *Papilio*; *P. E. A.*
 1906, R. & J., Nov. Zool., XIII, 540, *Papilio*.

syn. asterius Cram.

1770, Drury, Illus. Nat. Hist. Exot. Ins., I, 22, pl. XI, ff. 2, 3, 5, —; 1773, id., App. II, (as *troilus* in err.), *Papilio*.
 1782, Cram., Pap. Exot., IV, pp. 194-6, 248, pl. CCCLXXXV, ff. C, D, *Pap. Eq. Achiv.*
 1787, Fabr., Mant. Ins., II, 2, *asterias* (!), *Papilio*; *P. E. T.*
 1793, Fabr., Ent. Syst., III, (1), 6, *asterias* (!), *Papilio*, *P. E. T.*
 1906, R. & J., Nov. Zool., XIII, 543, *polyxenes* subsp., *Papilio*.

Fabricius sinks the name *Papilio* (*E. T.*) *polyxenes* to *asterius* Cramer ("asterias"!), 1787; omits name entirely, 1793.

Article 35 of the International Rules states: "A specific name is to be rejected as a homonym when it has previously been used for some other species of the same genus."; further stating that names of the same origin and meaning shall be considered homonyms if distinguished from each other only by "ei, i, y." It would appear that *Papilio polyxenes* and "*Papilio*" *polyxenes* are homonyms.

Article 28; "If the names are of the same date, that selected by the first reviser shall stand."

Article 28, *Recommendation "c"*; Other things being equal, that name is to be preferred which stands first in the publication."

Article 36; "Rejected homonyms can never be again used."

Thus it would appear, that Fabricius, as the first reviser, even under our modern "Rules," had the right to choose either name, "*polyxenes*" or "*polixenes*," page priority being in favor of the former, but against its acceptance a subsequently published name and figure.

While Fabricius does not state that *Papilio polyxenes* is a homonym, he does sink the name (1787); later, 1793, omitting it entirely, he uses "*asterias*" (*asterius* Cramer) in its place.

The authors, therefore, follow Fabricius, and sink the name *Papilio polyxenes* (as a homonym).

However, *Papilio ajax* Linn. enters into the synonymy. It would appear impossible, under the present "Rules", to follow Rothschild and Jordan in

considering the name unavailable, as the matter appears to be one of identification, rather than nomenclature. Undoubtedly, Linnaeus' references under *ajax* do not agree with his description. The "habitat" is "America boreali."

Apparently there are three common North American *Papilio* species to which the name might be fitted. The first is *ajax* Auct. (*marcellus* Cram.). Linnaeus *partim*, being only the citation to Edwards (Av. 34). The second is possibly a small male of *glaucus*, in which event, it would appear necessary to replace the name *turnus* by *ajax*; a very questionable determination of the name *ajax*, substantiated mainly by Linnaeus' citation, Rajus, *Hist. Ins.*, p. II, n. 2.

The only other determination is that it is conspecific with *polyxenes* Fabr. and *asterius* Cram. This is substantiated by an inadequate description; placement next to *machædon* in the "Systema Naturæ"; comparison of *xuthus* (*xanthus* in text, *xuthus* in index, Ed. XII) with it; and the fact that this common *Papilio* is not elsewhere described in Linnaeus' works, although specimens were in European collections, and it was plated by Clerck, 1764, as *ajax* Linn, about three years prior to *Systema Naturæ* Ed. XII.

Apparently the "Law of the First Reviser" can scarcely enter into this controversy for the reasons that the bibliographic references are to works prior to 1758; and also that at the most they could only be considered indications of what the name represented; indications contrary to both the original description and the placement of the name. Nevertheless, it might be said that Clerck, 1764, fixed the name *ajax* Linn.

The authors therefore propose the restriction of the name *P. ajax* Linn. to the species heretofore (R. & J.) listed as *P. polyxenes* and to that subspecies occurring in Boreal America heretofore (R. & J.) known as *asterius* Cram.

CANADIAN BEES OF THE GENUS OSMIA.

BY GRACE ADELBERT SANDHOUSE,

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(Continued from p. 41)

The following records are new:

Osmia abnormis Cresson.

BRITISH COLUMBIA: 1 male, Chilcotin, June 6, 1920, (E. R. Buckell); 1 male, Victoria, (A. W. Hanham); 1 male, Victoria, May 20, 1917, (A. E. Cameron); 3 males, Victoria, May 5-6, 1919, (W. Downes).

Osmia lungula Cresson.

BRITISH COLUMBIA: 5 females, Invermere, June 30, 1914, (F. W. L. Sladen); 1 female, Nicola, May 29, 1922, (P. N. Vroom); 1 female, Royal Oak, May 31, 1917, (R. C. Treherne).

Osmia pascoensis Cockerell.

BRITISH COLUMBIA: 2 females, Vernon, May 25, 1919 (W. B. Anderson); 1 female, Lillooet, May 28, 1917, (A. W. A. Phair); 1 female, Penticton, June 19, 1919, (E. R. Buckell); 3 females, Vasseau Lake, April 9, 1921, (F. W. L. Sladen).

Osmia armaticeps Cresson.

BRITISH COLUMBIA: 1 female, Kelowna, May 20, 1917, (R. C. Treherne).

Osmia nigrifrons Cresson.

BRITISH COLUMBIA: 1 female, Penticton, June 7, 1919, (E. R. Buckell);

1 female, Invermere, May 19, 1915, (F. W. L. Sladen); 1 female, Amherst, Madelein Isl., July, 1911, (F. Johansen); 1 female, No. 1688. 1 female, Osoyoos, June 10, 1919, (E. R. Buckell).

Osmia senior Cockerell.

BRITISH COLUMBIA: 1 female, Invermere, June 30, 1914, (F. W. L. Sladen); 1 female, Summerland, August 10, 1916, (F. W. L. Sladen); 3 females, Kaslo, August 3, 1916, (F. W. L. Sladen); 1 female, Vasseau Lake, May 25, 1920, (W. B. Anderson).

ALBERTA: 1 female, Banff.

Osmia wardiana Cockerell.

BRITISH COLUMBIA: 1 female, Invermere, July 30, 1916, (F. W. L. Sladen); 1 female, Revelstoke, May 16, 1915, (F. W. L. Sladen).

ALBERTA: 5 females, Banff, July 23, 1922, (C. B. D. Garrett).

Osmia densa Cresson.

QUEBEC: 2 females, Hemmingford, August 10, 1916, (J. I. Beaulne).

SASKATCHEWAN: 1 female, Melfort, July 20, 1916, (F. W. L. Sladen).

ALBERTA: 1 female, Calgary, July 8, 1917, (F. W. L. Sladen); 1 female, Edmonton, June 5, 1915, (F. S. Carr); 1 female, Lethbridge, July 18, 1917, (F. W. L. Sladen); 1 female, Medicine Hat, July 17, 1917, (F. W. L. Sladen).

MANITOBA: 4 females, Aweme, July 6-24, (N. Criddle and F. W. L. Sladen).

B. C.: 1 female, Victoria, July 6, 1916, (R. C. Treherne); 1 female, Sidney, May 8, 1915, (F. W. L. Sladen); 1 female, Penticton, June 2, 1919, (E. R. Buckell); 1 female, No. 150610.

Osmia atriventris Cresson.

MANITOBA: 6 females, Aweme, July 12-24, 1916, (F. W. L. Sladen and N. Criddle); 1 female, Teulon, June 20, 1922, (C. V.); 1 female, Sandridge, June 15, 1920, (C. V.).

SASKATCHEWAN: 1 female, Melfort, July 20, 1916, (F. W. L. Sladen).

Osmia olivacea Cockerell.

B. C.: 3 females, Okanagan Falls, June 3-16, 1919, (E. R. Buckell and W. B. Anderson); 1 female, Penticton, June 7, 1919, (W. B. Anderson); 2 females, Kaslo, June 3, 1916, (F. W. L. Sladen); 1 female, Lillooet, June 11, 1916, (E. M. Anderson); 1 female, Vasseaux Lake, June 12, 1919, (E. R. Buckell); 1 male, Vernon, May 25, 1919, (W. B. Anderson).

Osmia subpurpurea Cockerell.

ALBERTA: 2 females, Banff, July 23-27, 1922, (C. B. D. Garrett); 2 females, Squaw Mountain, Banff, August 11, 1916, (Sanson).

B. C.: 3 females, Kaslo, August 3, 1916, (F. W. L. Sladen); 1 female, Keremeos, June 18, 1919, (E. R. Buckell); 1 female, Invermere, Sainfoin Bank, May 27, 1915; 1 female, Vernon, July 28, 1920, (M. H. Ruhmann); 1 female, Vernon, June 14, 1919, (E. R. Buckell); 1 female, Lillooet, June 17, 1916, (E. M. Anderson).

June 30, 1914, (F. W. L. Sladen).

Osmia melanotricha Lovell and Cockerell.

ONTARIO: 1 female, Athens, July 1, 1916, (F. W. L. Sladen).

QUEBEC: 1 female, Aylmer, May 31, 1913, (F. W. L. Sladen).

MANITOBA: 1 female, Winnipeg Beach, July 17, 1916, (F. W. L. Sladen); 1 female, Teulon, June 16, 1920.

SASKATCHEWAN: 3 females, Melfort, July 20, 1916, (F. W. L. Sladen).

ALBERTA: 1 female, Banff, August 11, 1915, (Sanson).

B. C.: 1 female, Chilcotin, June 7, (E. R. Buckell); 1 female, Invermere, June 30, 1914, (F. W. L. Sladen). 1 female, Shawnigan, July 8, 1914, (F. W. L. Sladen); 1 female, Sidney, August 15, 1916, (F. W. L. Sladen).

N. W. T.: 1 female, Fort Norman, McKenzie River, August 6, 1922, (C. H. Crickmay).

Osmia distincta Cresson.

QUEBEC: 5 females, Chelsea, May 27-June 1, 1916, at blueberry, (F. W. L. Sladen).

Osmia phaceliae Cockerell.

B. C.: 1 female, Salmon Arm, July 4, 1914, (F. W. L. Sladen); 1 female Saanich Dist., June 3, 1919, (W. Downes); 2 females, Sidney, May 8, 1915, (F. W. L. Sladen); 2 females, Penticton, June 2-21, 1919, (E. R. Buckell); 1 female, Vasseau Lake, June 14, 1919, (E. R. Buckell); 4 females, Kaslo, August 3, 1916, (F. W. L. Sladen); 2 females, Osoyoos, June 10, 1919, (E. R. Buckell); 2 females, Victoria, May 20-June 3, 1916, (R. C. Treherne).

Osmia hypoleuca Cockerell.

ALBERTA: 1 female, Waterton Lakes, July 4, 1923, (J. McDunnough).

Osmia pentstemonis Cockerell.

ALBERTA: 3 females, Banff, August, 11, 1915, (Sanson).

B. C.: 1 female, Kaslo, August 3, 1916, (F. W. L. Sladen).

Osmia tcyanosoma Cockerell.

B. C.: 3 females, Invermere, June 30, 1914, (F. W. L. Sladen); 1 female, Kaslo, August 3, 1916, (F. W. L. Sladen); 1 female, Saanich District, Sept., 1, 1918, (W. Downes); 2 females, Agassiz, May 11, 1915, (F. W. L. Sladen).

ALBERTA: 1 female, Banff, (Sanson).

Osmia subtrevoris Cockerell.

B. C.: 2 females, Walhachin, June 27, 1918, (E. R. Buckell); 1 female, Invermere, June 30, 1914, (F. W. L. Sladen).

ALBERTA: 1 female, Lethbridge, July 6, 1921, (H. L. Seamans); 1 female, Banff, July 18, 1916, (C. G. Hewitt).

Osmia hendersoni Cockerell.

SASKATCHEWAN: 1 female, Prince Albert, July 22, 1916, (F. W. L. Sladen).

Osmia grindeliae Cockerell.

ALBERTA: 3 females, Banff, July 4-August 11, (Sanson).

Osmia integra Cresson.

B. C.: 1 male, Chilcotin, May 14, 1920, (E. R. Buckell).

Osmia lignaria Say.

B. C.: 2 males, Victoria, March 25, 1921, (F. W. L. Sladen); 1 male, Cranbrook, May 12, 1922, (C. D. B. Garrett).

Osmia viridior Cockerell.

B. C.: 2 males, Penticton, April 23-30, 1919, (E. R. Buckell); 1 male, Chil-

cent, May 12, 1920, (E. R. Buckell); 2 males, Vernon, May 25, 1919, (W. B. Anderson); 1 male, Nicola, May 16, 1922, (P. N. Vroom); 2 males, Summerland, April 7, 1921, (F. W. L. Sladen); 3 males, Vasseaux Lake, April 9, 1921, (F. W. L. Sladen.)

Osmia universitatis Cockerell.

B. C.: 1 male, Penticton, April 5, 1919, (E. R. Buckell).

Osmia integrella Cockerell.

B. C.: 1 male, Vernon, August 5, 1907.

ALBERTA: 1 male, Banff.

Osmia vallicola Cockerell.

B. C.: 4 males, Cranbrook, May 16-18, 1922, (C. B. D. Garrett).

Osmia eutrichosa Cockerell.

B. C.: 4 males, Penticton, May 20-June 22, 1919, (E. R. Buckell); 1 male, Agassiz, May 27, 1917, (A. E. Cameron); 7 males, Victoria, May 6-20, (R. C. Treherne and W. Downes); 1 male, Vernon, June 18, 1917, (R. C. Treherne); 2 males, Royal Oak, May 19-20, 1917, (R. C. Treherne); 1 male, Sidney, April 23, (F. W. L. Sladen).

ALBERTA: 5 males, Banff, May 25, (C. B. D. Garrett).

MANITOBA: 1 male, Teulon, June 20, 1922. 1 male, Aweme, April 22, 1915, (N. Criddle).

QUEBEC: 1 male, Aylmer, May 14, 1916, at *Vaccinium pensylvanicum*, (F. W. L. Sladen).

Osmia theta Sandhouse.

ALBERTA: 1 male, Banff, May 30, 1922, (C. B. D. Garrett); 2 males, Banff.

B. C.: 3 males, Blackwater Lake, Lillooet, May 21-27, 1916, (E. M. Anderson); 1 male, Cranbrook, May 16, 1922, (C. B. D. Garrett); 1 male, Kaslo, April 14, 1914, (Cockle); 1 male, Invermere, Sanfoin Basin, May 27, 1915, (C. U.); 1 male, Sicamous, May 16, 1915, (F. W. L. Sladen).

Osmia odontogaster Cockerell.

B. C.: 3 males, Victoria, April 6-May 6, 1916, (A. E. Cameron and R. C. Treherne); 1 male, Saanich, May 8, 1914, (T. Wilson); 1 male, Osoyoos, June 10, 1919, (E. R. Buckell).

Osmia pseudamala Cockerell.

B. C.: 2 males, Royal Oak, May 13-19, 1917, (R. C. Treherne).

Osmia bucephala Cresson.

ALBERTA: 1 male, Banff, May 3, 1922, (C. B. D. Garrett).

Osmia nifoata Cockerell.

B. C.: 1 male, May 5, 1918, (W. Downes); 1 male, Penticton, June 15, 1919, (E. R. Buckell).

Osmia enena Cockerell.

B. C.: 1 male, Invermere, Sanfoin Basin, May 27, 1915.

Osmia coloradensis Cockerell.

B. C.: 5 females, Vernon, July 26, and August 3, 1920, (R. C. Treherne and F. W. L. Sladen); 1 female, Fairview, May 18, 1919, (E. R. Buckell); 3 females, Summerland, August 9-10, 1916, (Sladen); 1 female, Lillooet, May 24, (A. W. A. Phair); 1 female, Victoria, June 4, 1916, (R. C. Treherne); 1 female, Black-

water Lake, Lillooet, June 26, 1916, (E. M. Anderson).

Osmia seneciophila Cockerell.

ALBERTA: 1 male, Banff.

Osmia tristella Cockerell.

B. C.: 1 female, Kaslo, Aug. 3, 1916, (F. W. L. Sladen).

Osmia kincaidii Cockerell.

B. C.: 2 females, and 2 males, Royal Oak, May 13-31, 1917, (R. C. Treherne); 1 male, Cranbrook, May 16, 1922, (C. B. D. Garrett); 2 females and 3 males, Penticton, May 20-June 20, 1919, (E. R. Buckell); 1 female and 1 male, Lytton, May 21, 1919, (W. B. Anderson); 3 females and 1 male, Victoria, May 5-June 3, (R. C. Treherne); 2 females, Kaslo, (J. W. Cockle); 1 female, Chase, June 9, 1920, (W. B. Anderson).

Osmia bella Cresson.

B. C.: 1 male, Spilimacheva, May 20, 1915, (F. W. L. Sladen).

Osmia holochlora Cockerell.

B. C.: 2 males, Penticton, May 30, 1919, (E. R. Buckell); 1 male, Blackwater Lake, Lillooet, May 25, 1916, (E. M. Anderson); 1 male, Lytton, May 21, 1919, (W. B. Anderson).

Osmia bruneri Cockerell.

B. C.: 1 female, Vasseaux Lake, June 14, 1919, (E. R. Buckell).

Osmia globosa Cresson.

QUEBEC: 3 males and 6 females, Aylmer, May 14-28, at *Vaccinium pensylvanicum* and blueberry, (F. W. L. Sladen); 2 females, Beaver Meadow, Hull, May 17, 1914, at violet, (F. W. L. Sladen).

ONTARIO: 1 female, White River, June 3, 1915, (F. W. L. Sladen).

NEW BRUNSWICK: 1 female, St. John, June 9, 1901, (A. G. Leavitt); Mac Nab's Island: 1 female, July 2, 1914.

ALBERTA: 5 males, Banff, May 21, 1915, (F. W. L. Sladen).

Osmia wilmattae Cockerell.

B. C.: 3 females, Penticton, June 5-29, 1919, (E. R. Buckell); 1 female, Peachland, July 21, 1909, (J. B. Wallis); 2 females, Sidney, May 8, 1915, (F. W. L. Sladen); 2 females, Mara, June 15, 1920, (R. C. Treherne); 2 females, Vernon, June 13-21, 1917, (R. C. Treherne); 1 female, Victoria, May 27, 1916, (R. C. Treherne); 1 female, Kaslo, Aug. 3, 1916, (F. W. L. Sladen); 1 female, Nanaimo, July 21, 1913; 1 female, Cranbrook, June 23, 1915.

Osmia conjuncta Cresson.

ONTARIO: 1 male, Ottawa, April 27, 1921, (J. H. McDunnough).

Osmia wheeleri Cockerell.

B. C.: 2 males, Invermere, May 19, 1915, (F. W. L. Sladen); 1 male, Penticton, June 7, 1919, (E. R. Buckell); 1 male, Keremeos, June, 18, 1919, (E. R. Buckell).

Osmia mertensiae Cockerell.

B. C.: 1 male, Lillooet, May 3, 1916, (E. M. Anderson); 1 male, Vancouver, April 13, 1904; 1 male, Okanagan Falls, May 13, 1919, (E. R. Buckell); 1 male, Penticton, June 7, 1919, (E. R. Buckell).

Osmia physariae Cockerell.

SASKATCHEWAN: 9 males, Indian Head, May 31, 1915, (F. W. L. Sladen); 1 male, Saskatoon, May 29, 1915.

ALBERTA: 1 male, Banff, June 15, 1922, (C. B. D. Garrett).

Osmia canadensis Cresson.

MANITOBA: 1 male, Teulon, June 18, 1920; 1 male, Aweme, July 12, 1916, (F. W. L. Sladen).

ALBERTA: 1 male, Banff, June 21, 1915, (Sansom); 1 male, Lethbridge, June 1, 1922, (H. L. Seamans).

B. C.: 1 male, Penticton, June 21, 1919, (E. R. Buckell).

Osmia mandibularis Cresson.

ALBERTA: 1 male, Lethbridge, July 18, 1917, (F. W. L. Sladen). 1 male, Medicine Hat, July 17, 1917, (F. W. L. Sladen).

Osmia coeruleescens Linn.

B. C.: 1 male, Chilecotin, May 15, 1920, (E. R. Buckell); 2 males, Victoria, April and May 1916, (R. C. Treherne).

ALBERTA: 1 male, Banff, May 21, 1915, (F. W. L. Sladen).

Osmia montana Cresson.

ALBERTA: 1 male, Banff.

B. C.: 1 male Otsapan Lake, April 23, 1914, (Tom Wilson); 1 male, Vasseau Lake, April 9, 1921, (F. W. L. Sladen); 1 male, Okanagan Falls, April 24, 1919, (E. R. Buckell).

Osmia clarescens Cockerell.

SASKATCHEWAN: 1 female, Saskatoon, May 29, 1915, (F. W. L. Sladen).

Osmia frigida Smith.

ALBERTA: 1 male, Nordegg, June 8, 1921, (J. H. McDunnough).

This specimen agrees with Smith's original description of the type, and also with Cockerell's notes on the type in the British museum. Cresson's description of *hudsonica* also seems applicable to this specimen; so it may be that *hudsonica* Cr. is a synonym of *frigida* Smith.

NEW SPIDERS FROM CANADA AND THE ADJOINING STATES, No. 4.

BY J. H. EMERTON,

Boston, Mass.

The following species of spiders have been found within the last few years by F. W. Waugh in Labrador and in Southern Ontario, by Mrs. W. W. Hippisley at Terrace, B.C., and by Miss E. B. Bryant at Barrington at the southern corner of Nova Scotia. The *Lophocarenum rotundum* occurs in both the Labrador and British Columbia collections and so is probably a northern Canadian species that may be found anywhere across the country. The Nova Scotia species are of special interest, coming from a place where no collecting had been done before. The *Pellenes* has its nearest relative in New Jersey. The *Gongylidium* has a peculiar modification of the front legs not found in any of its near relatives. The *Grammonata* occurs in large numbers as several of its relatives do at other points along the Atlantic coast and resembles closely the smaller *G. ornata* of the Massachusetts shores.

Ceratinopsis labradorensis n. sp.

2 mm. long and dark colored, the legs somewhat lighter and more yellow than the rest. The cephalothorax slightly longer than wide. The male palpus has the tibia as wide as long with a long process above extending in a point over the tarsus, which has a deep groove along the outer edge (Fig. 1 a. c.). The tarsal hook is angular at the base and long and slender toward the tip, where it is sharply curved (Fig. 1, a.). The tube of the palpal organ is curved in a nearly complete circle and its distal third is more slender than the basal part and turned abruptly backward upon it (Fig. 1, b.).

One male only from Cabot Lake, Labrador, (F. W. Waugh).

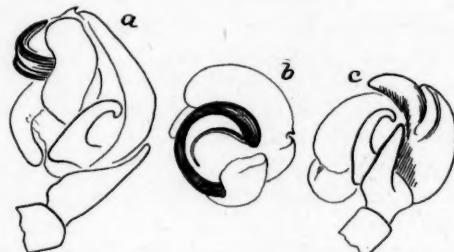


Fig. 1. *Ceratinopsis labradorensis*, male palpus, a. outer side to show tarsal hook, b. end of palpal organ with folded tube, c. tibial process and groove on tarsus.

Gongylidium arenarium n. sp.

2 mm. long, males a little smaller than females, pale without any markings. The males have the tibia of the front legs thickened and curved as shown in Fig. 2, a. The hairs on the under side of the front legs are arranged in two rows. The male palpi resemble those of *G. plumosus*, having the tibia short and wide with a small tooth on the upper side (Fig. 2, b. c.). The female, which is a little larger than the male, has the epigynum with a wide middle lobe in front of which are two openings (Fig. 2, d.).

Barrington, Nova Scotia, (Miss Bryant) under moist litter on the beach.

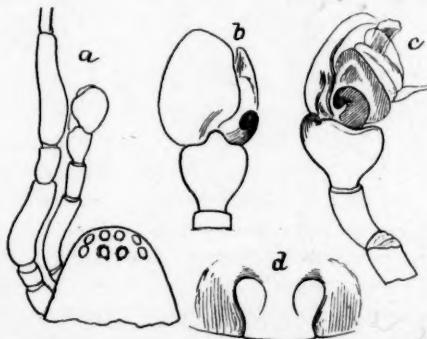


Fig. 2. *Gongylidium arenarium*, a. head, palpus and first legs from above showing curved tibia, b. c. male palpus, d. epigynum.

***Lophocarenum rotundum* n. sp.**

2 mm. long, cephalothorax dark brown, nearly as wide as long. Abdomen dark gray, nearly as wide as long and as high as wide. The sternum is as wide as long, extending between the posterior coxae so that they are separated by their diameter. The legs are orange brown, lighter than the cephalothorax.

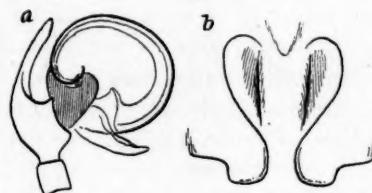


Fig. 3. *Lophocarenum rotundum*, a. male palpus from outer side, b. epigynum.

In males the cephalothorax is somewhat wider than in females, and a little raised in front, but without any holes behind the eyes, though there is a thickened line from the lateral eyes backward where these holes appear in other species as *L. erigonoides*. The male palpi are short and the tarsi and palpal organs large. The patella is twice as long as wide. The tibia extends forward over the tarsus in a long outward curved process on the inner side and a shorter outer one as in several other *Lophocarenum* and in *Cornicularia*. The tarsal hook is short and wide at the base (Fig. 3, a.). The tube of the palpal organ is large and conspicuous and curved in a circle on the outer side of the palpus (Fig. 3, a.). The epigynum has two openings, behind which are two flat, blunt lobes directed backward (Fig. 3, b.).

Two males and several females from Terrace, B.C., (Mrs. Hippisley), and one male from Cabot Lake, Labrador, (F. W. Waugh).

***Grammonata maritima* n. sp.**

2 to 5 mm. long. Cephalothorax light orange, only a little darker toward the front. Legs and palpi also light orange. Abdomen gray with light

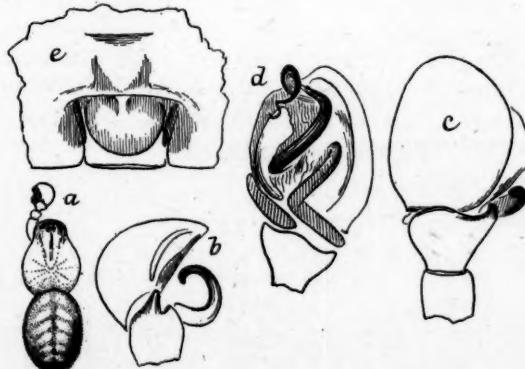


Fig. 4. *Grammonata maritima*, a. dorsal marking, b. outer side of male palpus, c. male palpus from above, d. palpal organ, e. epigynum.

markings not very sharply defined, especially toward the front (Fig. 4, a.). In many ways it resembles *G. ornata*, but is much larger and more brightly colored. The male palpus has a short, narrow and slightly curved process on the outer side of the tibia, quite different from the wide, flat process in *G. ornata*, and resembling more that of *G. inornata* (Fig. 4, c.). The epigynum, (Fig. 4, e), differs little except in size from that of *G. ornata*.

Found in large numbers in moist gravel on the seashore under litter washed up by the tide. Barrington, Nova Scotia, (Miss E. B. Bryant).

***Linyphia ontariensis* n. sp.**

4 mm. long, pale yellowish, resembling *Linyphia (Helophora) insignis*, but without the gray markings usual in the latter species. The immature individuals have faint indications of a lighter colored pattern on the back of the abdomen, (Fig. 5, b.). The mandibles are a little wider at the ends than in *L. insignis* and have four teeth in front of the claw and four very small ones behind it, (Fig. 5, c.). The epigynum is wide at the base and narrows at the tip, where the openings are placed as in *insignis*, (Fig. 5, e). The immature female has a triangular protuberance containing the undeveloped epigynum. The immature male has the palpi much enlarged at the end with a small horn at the base on the outerside, (Fig. 5, a.).

Six Nations Reservation, near Brantford, Ontario, (F. W. Waugh).

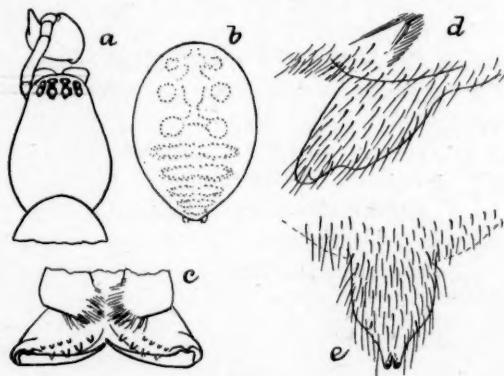


Fig. 5. *Linyphia ontariensis*, a. cephalothorax and palpus of immature male, b. faint markings of abdomen, c. ends of mandibles from below, d. e. epigynum.

***Pellenes peninsularis* n. sp.**

6 mm. long, cephalothorax 3 mm. Black, slightly mixed with gray, and bright white marks on cephalothorax and abdomen. The eye area has short gray hairs mixed with black so that it is a little lighter in color than the rest of the cephalothorax. Two white stripes extend backward from the outer eyes. On the front of the abdomen there is a white mark that continues down the sides and is broken into several spots. In the middle there is a white stripe in front, continued backward in a row of triangular spots, (Fig. 6, a.). The palpus is gray with some black hairs and markings around the tarsus. In general appearance this resembles *P. longimanus*, Em., described from New Jersey, but

the front legs are not as long, though longer than in most *Pellenes*, being equal in length to the third pair. The first and second legs have fine soft hairs as long as the diameter of the joints. The tibia, tarsus and metatarsus of the first leg are black, the other legs are mixed black and gray. There are no special ornaments on either first or third legs.

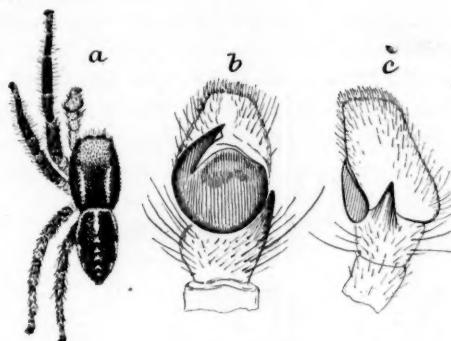


Fig. 6. *Pellenes peninsularis*, a. dorsal view of male, b. male palpus from below, c. male palpus from outer side.

The male palpi are shorter than in *P. longimanus* and the tarsus and palpal organ are larger, the tibia is as long as wide, with a short conical tooth on the outer side, (Fig. 6, c.). The palpal organ is circular with the tube short and curved, (Fig. 6, b.).

Barrington, Nova Scotia, on low plants near the shore, (Miss E. B. Bryant).

A PRELIMINARY NOTE UPON A HONEY-DEW FUNGUS.

BY THOMAS C. BARNES,
McGILL University, Montreal.

One of the most striking instances of the ecological relationships between fungi and insects is afforded by the fungus, *Scorias spongiosum*, which grows in the honey-dew excreted by Woolly Aphids. The honey-dew fungus described here differs considerably from the accounts of *Scorias spongiosum*. It has, therefore, been thought fitting to publish a preliminary note upon its appearance, structure and behaviour in a culture medium.

The specimen illustrated (Fig. 1) was collected on September 11, 1923, at Highwater, Que. The fungus forms a buff-colored spongy mass on the alder beside groups of the Woolly Aphid, *Prociphilus tessellata*, on twigs beneath the insects or on the ground to which the honey-dew is constantly dripping. The fungus is so saturated with honey-dew that the latter can be squeezed out by the hand. It has an agreeable taste of maple-syrup. Similar specimens were collected on September 6, at Sutton, Que. One specimen from Stanhope, Que., obtained August 21, was black in color. Since there were very few aphids present and the fungus was not soaked in honey-dew, this was probably an abnormal condition.

The fungus is composed of many cylindrical branches of pseudo-paren-

chyma bearing numerous curiously shaped appendages (Fig. 6). In some cases appendages from adjacent branches are interlocked, serving to bind the mass of branches together. It seems probable that some, at least, have an absorptive function, because the whole fungus is soaked in nutritive matter and does not draw its food from the substratum. At the tips of the branches occur perithecia containing asci and pycnia bearing pycniospores. Ascogenous perithecia were found in the material but none contained ripe asci. The pycnia are flask-shaped but, unlike those of *Scorias spongiosum*, lack stipes. They are greenish black in color in contrast to the buff-colored branch that bears them. No appendages occur on the pycnia or perithecia and those on the branches become smaller near the tips which bear the fruiting bodies.

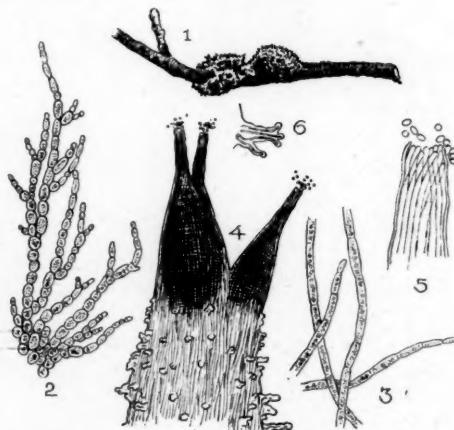


Fig 1. Fungus in situ on alder twig, Highwater, Que., Sept. 11, 1923; 2. Tuft of hyphae from culture, April 8, 1924 (x 350); 3. Hyphae from culture, April 16, 1924, (x 350); 4. Pycnia from specimen collected at Highwater, Sept. 11, 1923 (x 80); 5. Tip of pycnium with pycniospores (x 350); 6. Appendage from lower part of a branch. (x 80).

On February 28, 1924, a culture was made from a small piece of a specimen collected at Sutton, on the 6th of the preceding September. The fragment of fungus, after being passed through a flame, was suspended by a sterilized thread in a test-tube containing equal parts of saccharose and dextrose broths so that the fungus just touched the surface of the solution. In two weeks, filaments were extending through the solution from the piece of fungus which had turned black in color. The sides of the tube immediately below the surface of the solution were soon covered with a delicate layer of colorless, branched hyphae (Fig. 3). On March 27, the hyphae had extended slightly above the solution and there appeared dark brown. This upper dark part was composed of tufts of hyphae (Fig. 2) in which the cells were shortened, swollen and often spheroid. The brown color, which was darker toward the centre of each tuft, appeared to be due to an excretion surrounding the hyphae. Below the level of the solution, the hyphae were colorless, branched but not gathered into tufts. Here-and-there, especially towards the upper part of the submersed mycelium, the cells were swollen as in the aerial tufts already described. By April 8, the

upper tufted portion was densely black and about $\frac{1}{8}$ of an inch in height. No light penetrated the mass when placed on a microscope slide except at the edges where short filaments composed of the characteristic swollen cells projected. These were colorless but surrounded by a dark brown substance. On April 16, the upper part seemed still darker and denser and had reached a height of $3/16$ of an inch. The mycelium below remained colorless (Fig. 3) but was reduced slightly in area. The young hyphae were mounted for microscopical examination in formalin-sugar solution† in which they were preserved in a normal condition. In conclusion, it appears that either the descriptions of *Scorias spongiosum* consulted by the writer require considerable modification or that his material represents a species hitherto undescribed. Further culture studies will be made to determine the character of the mature asci and ascospores before a name is finally assigned to this type.

Thanks are due to Professor Carrie M. Derick for many helpful suggestions.

NEW GENERA AND SPECIES OF ICHNEUMONOIDEA IN THE
CANADIAN NATIONAL COLLECTION.*

BY HENRY L. VIÈRECK,

Ottawa, Ont.

BRACONIDAE

***Chelonella hoppingi* n. sp.**

Related to *C. shoshoneanorum* Vier.

Male. Differs from the female chiefly as follows, hind tibiae nearly entirely black but with a brownish-yellow mark on the inner side, mid-tibiae and all tarsi darker, end of carapace with a circular foramen beneath which there is a conical process that does not extend as far as the apex of the carapace, foramen smaller than tegulae, apical ventral edge of the carapace falling considerably short of the end of the carapace.

Female. Length 3 mm.; black, apical half of mandibles except apex, pale stramineous, palpi mostly blackish, legs black or blackish except the apical fourth of fore-femora, apex of mid and hind femora, all of fore and mid tibiae, basitarsi of fore and mid-legs, hind tibiae except base and apical fourth, and under side of hind basitarsi which are more or less yellowish-brown, wings transparent, infuscated, stigma and costa blackish, radius and bounding veins of areolet not so black as the stigma, rest of veins pale stramineous. Antennae with joint 1 of flagel to joint 2 of flagel as 6.5 is to 5, joint 2 nearly as long as joint 3, clypeus polished rather finely closely punctured, face transversely, finely wrinkled almost striate, vertex more coarsely sculptured, appearing indistinctly punctate; dorsulum more or less reticulated, the notauli represented by large meshes, disc of scutel striato-punctate, mesopleura more distinctly but not so loosely reticulated as the dorsulum; propodeum reticulated much like the mesopleura, its superior aspect with two trenchant longitudinal ridges, lateral teeth rounded and farther from the longitudinal ridges than the latter are from each

*—Contribution from the Division of Systematic Entomology, Entomological Branch, Dept. of Agric., Ottawa.

†—Jackson, F.S. A Method for the Preservation of Insect Larvae and Pupae. Can. Entomologist, Vol. 51, No. 5, May, 1919, p. 117; The preservation of Freshwater Bryozoa. Trans. Am. Microsp. Soc., Vol. XXXVIII, No. 3, July, 1919, p. 217.

other; greatest width of the carapace nearly equal to the greatest width of the thorax, narrowed toward apex which is triangularly emarginate, apical ventral edge of carapace nearly extending to the end of the carapace.

Holotype—♂, Midday Val., Merritt, B. C., July 10, 1923, No. 17051, lot No. 1072, *Pinus ponderosa* (R. Hopping); No. 1252 in the Canadian National Collection, Ottawa.

Allotype—♀, same data as the holotype except that the lot No. is 1084 and the date July 22, 1923.

Paratypes—2 ♀, with the same data as the holotype except as follows, lot No. 1074, July 12, 1923; No. 17111, lot No. 1238, July 27, 1923, No. 11; 2 ♂ with the same data as the holotype except as follows, No. 17045, lot No. 513, July 19, 1921, (G. Hopping) and No. 17045, lot No. 518, July 24, 1921 (G. Hopping).

***Chelonella plesius* n. sp.**

Essentially the same as *C. hoppingi* Vier. but differs as follows. Presumably related to *C. phthorimacae* Gahan.

Male. Length 2.5 mm.; legs black or blackish throughout except for the apex of fore-femora and all of the fore-tibiae that are pale brownish; end of carapace with a transversely oval, almost circular, foramen that is as large as the tegulae.

Holotype—♂, Midday Val., B. C., July 26, 1921, (G. Hopping) No. 7045, Lot No. 520, *Pinus ponderosa*; No. 1253 in the Canadian National Collection.

***Chelonus pygmaeus* new species**

Presumably related to *C. laverneae* Ashm. judging from a perusal of the published descriptions.

Male. Length 2.5 mm.; black, apical half of mandibles except apex, yellowish, legs black or blackish except for the tips of their femora more or less of their tibiae and metatarsi which are pale brownish, wings transparent faintly infuscated, stigma and costa blackish, other veins stramineous with a fuscous tinge. Antennae 28-jointed, joint 1 of flagel is to joint 2 of flagel, in length, as 6 is to 4, joint 2 as long as joint 3, clypeus shining, rather closely, distinctly punctured, face coarsely sculptured, vertex not so coarsely sculptured as the face; dorsulum more or less reticulated, the notauli represented by large meshes, disc of scutel nearly polished, indistinctly punctured, mesopleura reticulated, but more distinctly and not so loosely as the reticulated portion of the dorsulum; propodeum reticulated much like the mesopleura, its superior aspect with two trenchant longitudinal ridges, lateral teeth blunt, equilaterally triangular in outline when seen from within; greatest width of carapace is to greatest width of thorax as 19 is to 23, slightly narrowed at apex which is globular, seen from beneath, the distance between the apical ventral edge of the abdomen and the apex of the carapace, compared with the greatest width of the abdomen, is as 5 is to 10.

Holotype—♂, Midday Val., Merritt, B. C., July 10, 1923, No. 17109, lot No. 1268, *Pinus ponderosa*, (R. Hopping); No. 1245, in the Canadian National Collection, Ottawa.

Paratypes—4 ♂, same data as the holotype except as follows: lot No. 1265, July 7, 1923; Lot No. 1272, July 14, 1923; No. 1705, lot No. 585, July 12, 1922; and lot No. 582, July 19, 1922 (N. Cutler).

Cosmophorinus new subgenus.

Differs from *Cosmophorus*, as represented by the genotype, in its venation being notably different, having an incomplete radial cell like its American congeners *C. (C.) hopkinsi* Ashm., *C. (C.) hypothenemi* Brues, and *C. (C.) pityophthori* Roh. Mr. S. A. Rohwer has kindly furnished the information as to the radial cell in the old species.

Cosmophorus (Cosmophorinus) dendroctoni new species.

Presumably related to *C. (C.) hopkinsi* Ashm.

Male. Length 1.7 mm.; black or blackish except for the metathorax and propodeum which are castaneous, the petiole and mesopleura which are darker castaneous and the antennae and legs which are pale stramineous; face shining, indefinitely sculptured, mandibles castaneous with blackish tips; stigma and veins pale stramineous of a different shade than the legs and antennae, more or less infuscated, basal half of second tergite sculptured down its middle, length of the petiole down the middle is to its width at apex as seven is to six.

Otherwise this species agrees fairly well with Ashmead's description of *C. (C.) hopkinsi* Ashm.

Holotype—♂, Fredericton, New Brunswick, ex *Dendroctonus simplex* (L. J. Simpson); No. 1249 in the Canadian National Collection, Ottawa.

MYERSIIDAE

Myersia harringtoni n. sp.

Presumably related to *M. grandis* Cushman.

Female. Length 2.5 mm.; head seen from above slightly convex anteriorly, concave posteriorly, with its transfacial line twice as long as its axial line, temples rounded, axial line is to temporal line as 9 is to 4, cheeks strongly convex, malar space in length is to width of mandibles at base as 5 is to 2, width of clypeus is to its length as 4 is to 2.5, clypeus apparently undercut at apex, clypeus indefinitely sculptured, face sculptured somewhat like the clypeus except that its lower corners are polished, eyes apparently diverging below, front finely reticulated, shiny, without apparent polished scrobes separated by a ridge, vertex finely sculptured, temples less so, cheeks apparently polished, antennae with the penultimate joint apparently as long as thick, first joint of the flagellum apparently as long as the scape and pedicel combined; thorax shining, finely sculptured, mesopleura striate, sternauli distinct, metapleura rugulose; propodeum typical, apophyses nearly flap-like in outline; legs typical; abdomen typical, dorsal carinae of first tergite represented between the spiracles and the apex by two median longitudinal welts, first tergite apparently coarsely shagreened, length of exserted portion of sheaths is to the length of the thorax as 16 is to 20; brownish stramineous, appendages paler, yellowish stramineous, sheaths of the ovipositor fuscous, wings nearly colorless, veins pale stramineous.

Holotype—♀, Hull, Que., June 9, 1895, (W. H. Harrington); No. 1244 in the Canadian National Collection, Ottawa.

Myersia nigra n. sp.

Female. Length 4 mm.; compared with a male of *M. laminata* Vier, this differs chiefly as follows, malar line is to width of mandibles at base as 4 is to 2, cheeks nearly flat, hardly rounded, inner eye margin appreciably diverging be-

low, flagel as thick as the pedicel, thickness of scape is to thickness of pedicel as 3 is to 2. Black, trochanters and femora reddish, fore and mid tibiae and fore-metatarsi stramineous, other tarsi more or less fuscous, hind tibiae reddish-fuscous.

Holotype—♂, Keremeos, B.C., June 2, 1923 (C. B. Garrett); No. 1266 in the Canadian National Collection, Ottawa.

ICHNEUMONIDAE

Cymodusoides new genus.

Related to *Strobila* Schmiedeknecht from which it may be known by its long malar space. Eyes converging below recalling the convergence of the eyes in *Cymodusa* Holmgren. (Genotype: *Cymodusoides gracilis* n. sp.).

Cymodusoides gracilis new species.

Compared with Schmiedeknecht's description of *Strobila alpigena*, this differs as follows:

Female. Length 3.5 mm.; black, scape, pedicel and joint one of flagel pale stramineous beneath, joints four and five of flagel brownish beneath, remainder of antennae more or less blackish, palpi mostly stramineous, tegulae stramineous wings brownish, stigma and veins blackish, fore and mid-legs stramineous, hind legs reddish excepting the blackish basal half of the hind coxae, abdomen blackish, the second, third and fourth tergites with a dark stramineous apical margin. Antennae 22-jointed, joint one of flagel apparently longer than joint two, joint 22 of flagel nearly as thick as long, length of malar space is to shortest distance between eyes as two is to four, dorsulum indistinctly punctured, polished; propodeum with its areola six sided and a little longer than wide; last joint of tarsi distinctly longer than the preceding joint; postpetiole, second tergite and most of third tergite more or less finely striate, fourth, fifth and sixth tergites polished and indistinctly punctured, exserted part of sheaths longer than the second tergite, tergites not noticeably swollen along their apical margin.

Holotype—♀, Aylmer, Que., July 9, 1924 (C. H. Curran); No. 1269 in the Canadian National Collection, Ottawa.

Cymodusoides plesius new species.

Compared with the preceding description this differs as follows:

Female.—Length 5 mm.; black, scape stramineous, pedicel partly infuscated, flagel mostly brownish throughout, hind legs reddish excepting the tarsi which are blackish, prothorax stramineous, lower part of mesopleura and all of mesosternum reddish, abdomen with the apical margin of the first, second, third and fourth tergites with a stramineous border that is widest on the second and third; joint 22 longer than thick; areola distinctly longer than wide; second and third tergites hardly, if at all, striate, exserted part of sheaths is to the length of the second tergites as 12 is to 14.

Holotype—♀, Orillia, Ont., July 15, 1923 (C. H. Curran); No. 1270 in the Canadian National Collection, Ottawa.

Pristomerus (Pristomerus) idei new species.

Related to *P. laticeps* Cushman.

Female.—Length 3.5 mm.; black, transfacial line is to the facial line as 18 is to 14, axial line is to temporal line as 10 is to 1.7, temples, malar space and inner orbits, dullish, shagreened, rest of face finely punctured and shining except

down the middle where the raised part is polished and finely punctured, distance between the eyes at anterior edge of antennal sockets is to distance between eyes at base of clypeus as 7 is to 8, clypeus polished appearing brownish and punctured, width of clypeus is to length of the same as 4.5 is to 2, malar line is to width of mandibles at base as 1.5 is to 3, ocelli nearly equidistant, greatest diameter of lateral ocellus is to the ocellocular line nearly as 2 is to 1.2, scape pale stramineous, pedicel brownish with pale edge, flagel blackish with more or less pale sutures, flagel 26-jointed, joint 1 nearly four times as long as thick and nearly as long as joint 2, the penultimate joint nearly as thick as long, mandibles yellowish with reddish apex, palpi stramineous; mesonotum dullish, shagreened, apparently impunctate, mesopleura partly polished mostly shiny and finely but definitely punctured and shagreened, metapleura more densely sculptured than mesopleura, width of outer side hind femora is to their length as 4 is to 18, length of tooth is to outer width of hind femora as 2 is to 4, denticles indistinct, fore and mid-legs mostly pale stramineous, hind legs mostly brownish, trochanters, base and apex of femora and tooth pale stramineous, tibiae blackish except for the middle third which is pale stramineous, tarsi blackish excepting the base of the metatarsi which is pale stramineous, spurs whitish, nervulus nearly interstitial, wing nearly colorless, stigma blackish brown, translucent, veins virtually concolorous with the stigma, wing base, tegulae and tubercles pale stramineous; propodeum coarsely sculptured as compared with the thorax, areola five sided, the widest part apparently nearer to the base of the areola than to its centre; abdomen blackish brown, darker than the hind femora, sternites mostly, second to sixth tergites apically base and part of sides of third tergite, pale stramineous, seventh tergite brownish, sheaths of the ovipositor in length are to the length of hind femora as 55 is to 18, and to the length of the abdomen as 55 is to 45.

Holotype—♀, Black Rapids, Rideau River, Ont., Aug. 2, 1924, (F. P. Ide); No. 1255 in the Canadian National Collection, Ottawa.

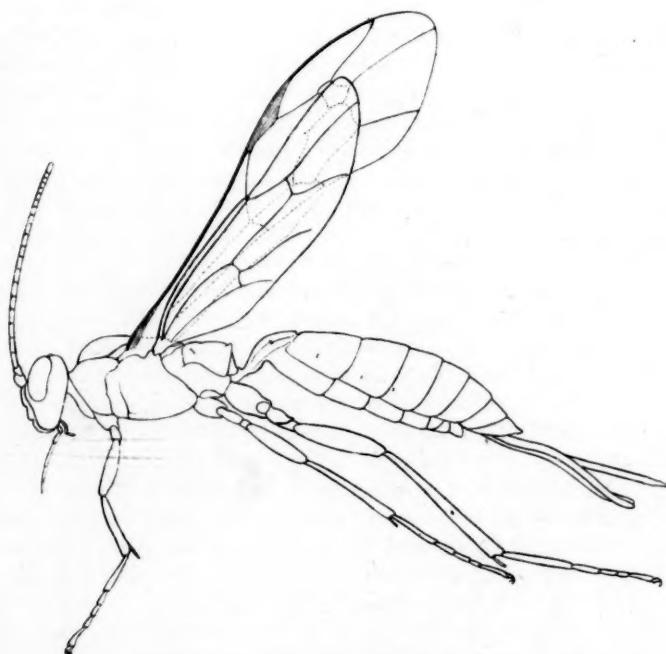
Neostricklandia new genus.

In Foerster's classification this is a Phygadeuonine agreeing best with *Dapanus* Foerster from which it differs at least in having the discocubital cell wider at base than the second discoidal cell is wide at apex. In Schmiedeknecht's classification this appears to be a *Trichocryptus* Thomson but that has round spiracles on the propodeum. Propodeum cubical, its posterior aspect nearly vertical, the caudad lateral edge prolonged into a rounded flange-like process, spiracles slit-like and in length are to the thickness of the first joint of the flagel as 2.5 is to 2. [Fig. 1.]. Genotype: *Neostricklandia sericata* new species.

Neostricklandia sericata new species.

Female.—Length 9.5 mm.; black, densely sculptured, covered with short whitish hairs that give the whole body a velvety appearance, palpi brownish, malar line is to width of mandibles at base as 9 is to 7, anterior edge of clypeus slightly concave, front and vertex excavated so that the ocelli are on a lower plane than the eyes, antennae 22-jointed, first joint of the flagel apparently as long as the second, penultimate joint not much longer than thick; notauli deeply impressed to a point half way back on the dorsulum where they end in rugosities, prepectal carina trenchant, sternauli deeply impressed terminating half way back to a point at the junction of the external and inferior aspects of the mesopleura,

wings transparent, faintly infuscated, veins blackish, excepting the basal part of the subcosta, the costa and submedian veins which are brownish, ramellus nearer the transverse cubitus than to the discoidal veins, stigma blackish brown, disc of scutel whitish, the superior aspect or disc of the scutel nearly rectangular, its caudad limits narrower than its cephalad limit; legs reddish excepting the trochanters, tarsi and base and apex of mid and hind femora which are mostly



if not entirely blackish; propodeum separated from the metapleura by a trenchant carina, only the costulae of the basal transverse carina present, median longitudinal carinae wanting, lateral longitudinal carinae present but incomplete only on the caudad aspect of the propodeum, areola suggested by a difference in sculpture, not defined cephalad and imperfectly defined laterally, caudad aspect of propodeum excavated; abdomen blackish, more shining and more distinctly punctured than the dorsum, the sternites save the apical one with an apical whitish margin, second tergite laterally and the third with its basal lateral corner, more or less reddish, length of the sheaths of the ovipositor beyond the end of the abdomen is to length of the abdomen as 70 is to 120, length of first tergite is to its caudad width as 30 is to 21, dorsal carinae of first tergite hardly extending beyond the spiracles, the lateral carinae extending throughout the length of the tergite.

Holotype—♀, Elk Isl., Alta., Aug. 12, 1923, (E. H. Strickland); No. 1267 in the Canadian National Collection, Ottawa.

Thysiotorus Foerster

RECOGNITION KEY TO NORTH AMERICAN SPECIES.

1. Nervellus angulated (Panargyrops) 2
- Nervellus not angulated (Thysiotorus); abdomen with a median pale mark. *smithi* Cushman
2. Thorax more or less reddish 3
- Thorax not partly reddish 4
3. Abdomen mostly reddish *seamansi* n. sp.
- Abdomen black, with whitish bands *peregrinus* Cresson
4. Fore and mid-coxae whitish 5
- Fore and mid-coxae not whitish 7
5. Tegulae without a white line in front 6
- Tegulae with a white line in front *sericeus* Provancher
6. Tuberles white *tibialis* Cresson
- Tuberles stramineous *seamansi* Viereck
7. Scape black below 8
- Scape yellowish below, ♂ *conjunction* n. sp.
8. Tegulae not entirely pale 9
- Tegulae pale yellowish to whitish *texanus* Cushman
9. Tegulae more or less fuscous 10
- Tegulae reddish *tegularis* n. sp.
10. Tegulae entirely fuscous *pacificus* Cushman
- Tegulae melleous and fuscous, ♀ *conjunction* Viereck

Thysiotorus (Panargyrops) *seamansi* n. sp.

Female.—Length 7 mm.; exserted portion of sheaths in length is to the length of the first tergite as 32 is to 31, head partly polished, partly dullish, finely punctured, face nearly velvety with silvery hairs, rest of head not so densely hairy, clypeus mostly covered with nearly appressed hairs, its anterior margin faintly bidentate, length of the malar space is to the width of the mandibles at base as 3 is to 6, scape nearly globose; thorax partly polished, finely punctured, pubescent like the temples, nervellus angulate far below the middle, not branched, second transverse cubitus nearly as well developed as the first; propodeum almost completely areolated, the areas nearly smooth, areola six sided, the costulae joining the same nearer the middle of the outermost side of the areola than to the anterior margin; abdomen nearly polished, finely punctured and sericeous, spiracles of the first tergite a little nearer the base of this tergite than to its apex, dorsal carinae or first tergite extending to the apex. Black; mandibles mostly, scape below, tegulae partly, wing base, fore coxae and trochanters yellowish, collar and tubercles reddish, fore and mid legs stramineous to brownish-stramineous except the tarsi which are fuscous in the mid legs and partly so in the fore legs, hind coxae and femora reddish, hind trochanters blackish, hind tibiae reddish, with the apical third mostly blackish, hind tarsi blackish, wings weakly infuscated, veins mostly and stigma blackish, terminal abscissa of cubitus stramineous, first tergite black excepting the apical half of the post petiole which is mostly reddish, first sternite mostly black, otherwise the abdomen is reddish except for the apical tergite which is blackish, the ventral fold which

is yellowish and the other sternites which have dark marks enclosed by pale borders.

Holotype—♀, Waterton, Alta., July 14, 1923, (H. L. Seamans); No. 1256 in the Canadian National Collection, Ottawa.

Paratypes—3 ♀, from the type locality, July 11, 15, 17, 1923, (H. L. Seamans); ♀, Queen's Park, Aylmer, Que., Aug. 11, 1924, (A. R. Graham).

One female paratotype is abnormal in having the abdomen much flattened with the spiracles of the first tergite out on ear-like productions of the tegument. In the Aylmer paratype the reddish part of the thorax is so dark as to make the thorax appear black throughout.

Thysiotorus (Panargyrops) conjunctus n. sp.

Presumably related to *T. (P.) texanus* Cushman. Compared with the description of *T. (P.) seamansi* Viereck this differs as follows in the female.

Female.—Exserted portion of sheaths in length is to the length of the first tergite as 72 is to 30, nervellus branched, the branch or discoidal vein translucent and not attaining the wing margin; spiracles of the first tergite virtually half way between the base and the apex, dorsal carinae of first tergite not extending to the apex, scape black throughout, tegulae pale stramineous, infuscated internally and posteriorly, wing base whitish, fore and mid-coxae dark stramineous, collar and tubercles black, proximal hind trochanter reddish, hind femora blackish at apex, hind tibiae and tarsi black or blackish, abdomen virtually black or blackish throughout, the ventral fold pale stramineous almost whitish.

Male.—Essentially like the female except as noted in the key, in having a stump of a discoidal vein branching off from the nervellus and in having elongated areas to the propodeum.

Holotype—♀, Banff, Alta., July 24, 1924, (C. B. D. Garrett); No. 1258 in the Canadian National Collection.

Allotype—♂, with the same data as the holotype excepting the date which is June 12, 1922.

Thysiotorus (Panargyrops) tegularis n. sp.

Also presumably related to *T. (P.) texanus* Cushman. Compared with the description of *T. (P.) seamansi* Viereck this differs as follows in the female. Exserted portion of sheaths in length is to the length of the first tergite as 90 is to 35, length of malar space is to width of mandibles at base as 4 is to 6.5, nervellus with a branch as in *T. (P.) conjunctus* Viereck; dorsal carinae of the first tergite not extending to the apex; color as in *T. (P.) conjunctus* Viereck excepting the tegulae.

Holotype—♀, Agassiz, B. C., June 23, 1922, (W. B. Anderson); No. 1259 in the Canadian National Collection, Ottawa.

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